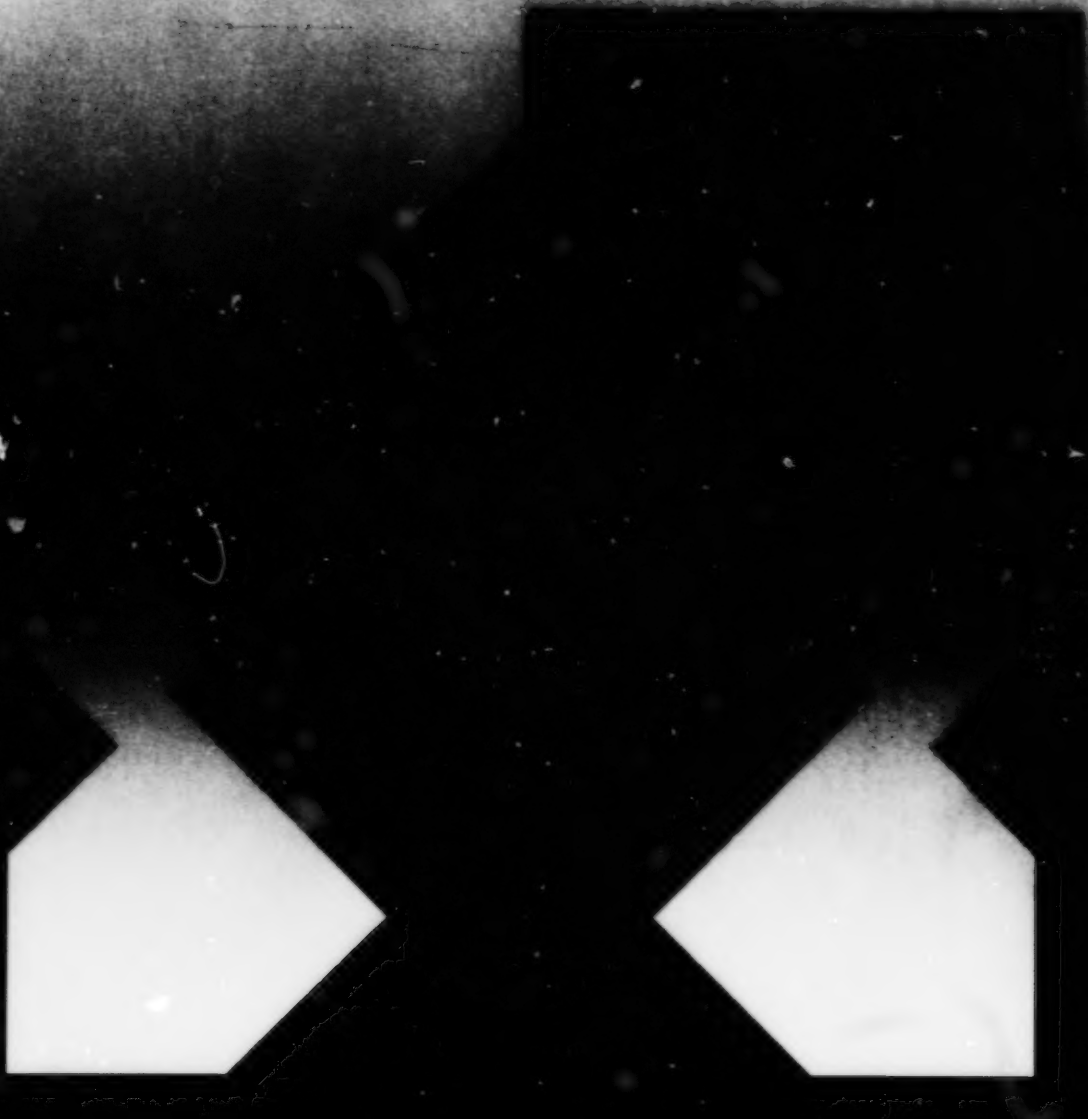


Canada Mortgage
and Housing
Corporation



Société canadienne
d'hypothèques et
de logement



CMHC Helping to
house Canadians

THE WOOD/GAS FORUM REPORT



THE CANADIAN WOOD ENERGY INSTITUTE
L'INSTITUT CANADIEN DE L'ENERGIE DU BOIS



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THE WOOD/GAS FORUM REPORT (Revised)

JUNE 11-12, 1989

THE CANADIAN WOOD ENERGY INSTITUTE

Richmond Hill, Ontario

1) **FORUM BACKGROUND:**

The Canadian Wood Energy Institute (CWEI) is a "not for profit" industry association dedicated to the safe, efficient use of wood heating systems in Canada. To complement existing CWEI programs; WETT (Wood Energy Technical Training) and WISE (Wood-Heat Information and Safety Education), and to maintain the CWEI leadership in the field of Solid Fuel, the Institute initiated planning for an event combining a trade show, technical workshops and the CWEI annual meetings. This event evolved into the Wood/Gas Forum. The gas dimension to the Forum was new to the Institute, and recognized the broadening of the marketplace to include gas fireplaces.

To assist the CWEI in meeting its primary objective of providing its members and other industry stakeholders with the opportunity for meaningful dialogue, debate and technical presentations, the CWEI sought sponsors to help offset some of the costs associated with holding the Forum. These included Canada Mortgage and Housing Corporation (CMHC), Vermont Castings, Security Chimneys, Selkirk Metalbestos, Regency, Elmira, GSW, and the Ontario Ministries of the Solicitor-General and Energy.

2) **FORUM OVERVIEW:**

The Wood/Gas Forum took place June 11 and 12, 1989 at the Skyline Hotel in Toronto. The total registration at the event was 220 persons, which included Forum sponsors, trade show exhibitors, speakers and registered participants. While the greatest percentage of those attending were from Ontario, 22 persons attended from other parts of the country, including B.C., Yukon, Alberta, Quebec, New Brunswick and Nova Scotia, 11 from the U.S., and 1 from Italy.

The booths in the trade show area exceeded estimated demand, both in the number and variety of products displayed. A total of 33 booths were featured and the "No Frills" tabletop nature ⁽¹⁾ of the trade show was well received and will be included in all future Forums. There was some misunderstanding as to what constituted a "No Frills" booth, which must be resolved for the future, but clearly the approach has the support of the Fireplace Industry.

The format for the event centered around three different workshops being offered simultaneously in different locations. While several workshops were offered twice, the great majority took place only once. Each session had a moderator drawn from industry and panel of presenters providing different points of view. Time was provided at the conclusion of each workshop for questions from the floor. Evaluations for each workshop were distributed at the beginning of the session and were collected at the conclusion. The results of those findings are included as appendices to this report.

(1) A trade show with no more than one product per manufacturer.

In addition, an overall event evaluation form was included in each forum kit. Unfortunately, the importance of these evaluations was not adequately identified as, in turn, only 32 were returned. These result in some interesting findings:

1. Would you attend a similar event next year?

28 Yes 4 Maybe 0 No

2. Would you be willing to assist in next year's Forum?

11 Yes 6 Maybe 15 No

3. What topics should be offered for next year's Forum?

- Most topics should be repeated but eliminate the sales pitches.
- Pellet furnaces
- The history of fire
- Keep up emphasis on emissions in Canada, perhaps a "living" speaker from EPA
- "Stump the Experts" was great
- Gas should be explored more fully; liners; gas technology
- Air makeup
- Marketing
- Since I missed some sessions, please offer everything twice
- More on CMHC research, love those gov't eggheads
- New developments in masonry not old news, what about counterflow fireplaces and heaters?
- Next year, concentrate on store design and local marketing. Possible theme "Upgrading the store".

4. What type of business are you in?

15 Retailer	4 Sales	0 Utility
9 Installer	7 Distributor	1 Building Official
6 Sweep	7 Manufacturer	2 Other

5. Please check the nature of your business.

7 Wood	21 Wood and Gas
2 Gas	1 N/A

FOR MANUFACTURERS/DISTRIBUTORS

6 Did you have a booth at the Forum?

5 Yes

4 No

4 Yes, also a sponsor

7 Will you return to a Forum event in Ontario next year?

11 Yes

1 Maybe

0 No

3 Yes, and we would
consider a sponsorship

COMMENTS:

- Keep the event simple "not glitzy". Don't return to the full blown trade show. Consider substituting a barbecue and beer bash for the banquet which didn't fit the event.
- I learned a lot. I came away from each session with at least one or two things. I consider that a success. The hospitality, friendliness and coordination of the event was exceptional.

8 Consideration is being given to holding a similar event in Vancouver and Halifax as early as this September. Would you be interested in taking part?

3 Yes

9 No

1 I don't know

COMMENTS:

- Preferably Vancouver, but not til March/April
- Can't afford the time in that time slot
- September too busy, January through March is better timing
- Not a hope in hell - nobody can attend August-February
- No, season in full swing - no time
- We would be interested in both cases. However, very concerned about September timing.

3) THE CMHC WORKSHOPS

One of the highlights of the Wood/Gas Forum was the technical sessions on fireplace and chimney function presented by Canada Mortgage and Housing Corporation (CMHC). The Corporation has invested considerable resources over the past five years in the study of how combustion appliances

and their venting systems operate in conventional housing and the newer well-sealed houses. CMHC was a major sponsor of the Forum and was eager to hear our industry's reaction to their work. Four research projects were reported on.

The first and most ambitious was a laboratory research project conducted by ORTECH (formerly the Ontario Research Foundation). The project involved the testing of five factory-built fireplaces that were representative of the various types now on the market. The objectives were to determine how sensitive fireplaces are to house depressurization and to see how effective outdoor air supplies are in preventing room depressurization and smoke spillage.

Significant Findings

There were several very significant findings. The first was that well built fireplaces with closed doors do not consume much room air at low to medium burn rates and would not be a major factor in house depressurization. This contradicts the widely held belief that fireplaces act as powerful exhaust ventilators that can cause gas furnaces and water heaters to backdraft. Of course a large fireplace at full fire with doors open can consume a significant amount of air, but this is not the normal mode of operation for modern factory-built fireplaces.

The second main finding was that despite major design differences, all the fireplaces could tolerate room depressurization in the range of 5 to 10 Pascals (0.02 to 0.04 in. w.c.) without smoke spillage. And all the fireplaces started to spill at around 10 Pascals of room depressurization when the fire had died down to the coal bed stage. These tests were conducted with the doors closed.

Make-up Air Supply

Another result of the research that may surprise many people was the relative performance of the two main approaches to the design of outdoor air inlets. The most common outdoor air design, in which the air enters a circulation chamber under the firebox, was unable to supply the total air requirements of the fireplace during medium to high burn rates at a room pressure of -5 Pa. In fact, the researchers estimated that the normal 100 mm (4") diameter ducts supplied with most fireplaces would have to be two or three times as large to match the fireplace exhaust rate at low burn. This type of air supply is also very susceptible to reverse flow when the pressure at the weatherhood becomes negative. Negative pressure at the weatherhood is a common occurrence caused by wind effects on the downwind side of the building. Pressures as little as -3 Pa. caused a reverse flow in the duct. The air reversing in the duct would not be hot enough to overheat adjacent combustibles, but could depressurize the house.

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Combustion Air Supply

The other outdoor air supply design connects the duct directly with the fireplace combustion chamber. This design makes the fireplace slightly more resistant to spillage during high burn periods when chimney draft is strong, but as the fire dies down, spillage occurs at about the same point as with the indirect air supplies. The big risk with direct air supplies is that if the area at the weatherhood is depressurized enough to cause a reverse flow, the hot flue gases could cause overheating of the duct and combustibles around it.

WOODSIM

The laboratory research has been used to refine and confirm the results given by WOODSIM, CMHC's fireplace computer simulation. WOODSIM permits further work to extend the study to masonry and other types of fireplaces and chimneys.

The fireplace testing project indicated that chimney draft was the most significant factor affecting the amount and timing of smoke spillage. When the room pressure was about 3 Pa. less than the draft at the base of the chimney, backdrafting would occur. This result was found with all the designs with only slight differences.

CMHC'S Other Projects

Three other projects were reported on at the Forum. One was a survey of the aerodynamic and thermodynamic performance of chimneys and ducts. A duct test rig (DTR) was developed to establish true flow performance of chimneys, ducts and fans, an improvement over the theoretical figures that had been used.

CMHC also tested a number of chimneys in its test house in Ottawa. The objective was to evaluate the role of sizing and insulation levels by comparing the performance of conventional masonry, 650 degree factory-built, A vent and a super insulated 100 mm (4") diameter chimney using variously sized and insulated vent connectors. A one hundred thousand BTU oil furnace was vented into each of the chimneys. The small chimney worked well during steady state operation, but allowed some spillage at start-up. The work suggested that a 125 mm (5") chimney would easily vent a residential furnace of average to large size. Such furnaces are commonly vented into much larger masonry and metal chimneys. One of the most significant findings is the important role of the vent connector (flue pipe): if it is well insulated, the system has a good chance of performing well.

Finally, CMHC contracted with Buchan, Lawton and Parent, an Ottawa consulting firm, to study improved make-up air supplies for houses. Since outdoor air supplies for fireplaces and other combustion devices did not perform particularly well in preventing spillage during house depressurization, the goal was to find ways to reduce depressurization of the house. The consultants devised and tested a make-up air system that sensed house pressure and automatically pumped pre-heated air into the house when its pressure became excessively negative. This may turn out to be the best approach to managing house pressures.

Summary

Those who attended the CMHC sessions had very positive comments:

"Fascinating, relevant - best seminar of the Forum."

"Great."

"Dry - but good."

"Very well presented."

"I found it interesting and am waiting for the final reports."

"Very informative and important."

The CMHC work calls into question the current requirements in some building codes making the supply of outdoor air to all fireplaces mandatory. CMHC will be publicizing its results in an effort to assist code writers in making effective decisions on ways to protect homeowners from indoor air pollution caused by spillage of combustion devices.

A full summary of the CMHC workshops is included in the appendices.

4) OVERALL RECOMENDATIONS FOR FUTURE FORUMS

- (1) A hearty thanks is extended from the Board of the CWEI to all sponsors, trade show exhibitors, speakers and moderators for their efforts on behalf of the Forum and the continued health of the industry and the CWEI.
- (2) The Wood/Gas Forum was both well received and well supported. As with all startup ventures, there are some aspects that require fine tuning, all efforts should now be focused on next year's Forum, building on the success of the inaugural event.
- (3) Next year's Forum should be jointly presented by the CWEI and ARWETO - Association of

.../...

Registered Wood Energy Technicians of Ontario. (This is currently the case in the planned B.C. Forum in Vancouver this September, and should be followed by the Atlantic WET Organization in Halifax.) This will permit the utilization of greater volunteer resources.

- (4) Early in the Fall, an open meeting should be convened to organize next year's Forum. All sponsors, trade show exhibitors, and other interested parties should be invited to attend. Committees would be formed at that time to undertake the various tasks necessary for a successful event.
- (5) The full support of the CGA and ONGA should be acquired to provide the credibility necessary to represent the gas side of the Forum. A follow-up should be undertaken as soon as possible.
- (6) The marketing of the Forum cannot be limited to the CWEI-WETT memberships. Every effort should be made to reach building officials, gas utilities, insurance and other industry members. Manufacturers and distributors have an especially important role to play in the success of the Forum and the overall health of the Industry.
- (7) The CWEI, when negotiating with Federal departments or agencies, should negotiate participation in all planned Forums (Vancouver, Toronto and Halifax) equally.
- (8) The "No Frills" nature of the trade show was well received and will be continued and strengthened in future forums.
- (9) All speakers and moderators taking part in workshops must refrain from product promotion and approach the sessions from a non-partisan perspective.